

AD-A148 712

# RD CENTER and LABORATORY TECHNICAL REPORT

No. 13025

## T-156 TRACK WITH REMOVABLE PAD

CONTRACT DAAE07-81-C-4091

SEPTEMBER 1984



A.B. Kendall  
The Standard Products Company  
215 Maple Street  
Port Clinton, Ohio  
43452

by

APPROVED FOR PUBLIC RELEASE:  
DISTRIBUTION UNLIMITED

20000803199

**U.S. ARMY TANK-AUTOMOTIVE COMMAND  
RESEARCH AND DEVELOPMENT CENTER  
Warren, Michigan 48090**

84 12 18 001

NOTICES

This report is not to be construed as an official Department of the Army position.

Mention of any trade names or manufacturers in this report shall not be construed as an official endorsement or approval of such products or companies by the US Government.

Destroy this report when it is no longer needed. Do not return it to the originator.

# REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified		1b. RESTRICTIVE MARKINGS None	
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for Public Release. Distribution Unlimited.	
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE			
4. PERFORMING ORGANIZATION REPORT NUMBER(S)  4701		5. MONITORING ORGANIZATION REPORT NUMBER(S)  TACOM TR 13025	
6a. NAME OF PERFORMING ORGANIZATION  The Standard Products Company	6b. OFFICE SYMBOL (if applicable) Code-98761	7a. NAME OF MONITORING ORGANIZATION  TACOM / DRSTA-RCKT	
6c. ADDRESS (City, State, and ZIP Code)  Port Clinton, Ohio 43452	7b. ADDRESS (City, State, and ZIP Code)  Warren, Michigan 48090 Bldg. 215		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION  Combat Systems Div.	8b. OFFICE SYMBOL (if applicable) AMSTA-RC	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER  DAAE07-81-C-4091	
8c. ADDRESS (City, State, and ZIP Code)  TACOM Warren, Michigan 48090	10. SOURCE OF FUNDING NUMBERS		
	PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
			WORK UNIT ACCESSION
11. TITLE (Include Security Classification)  T-156 Track with Removable Pad - Unclassified			
12. PERSONAL AUTHOR(S) A.B. Kendall			
13a. TYPE OF REPORT Final	13b. TIME COVERED FROM 9-1-81 TO 12-15-83	14. DATE OF REPORT (Year, Month, Day) September 1984	15. PAGE COUNT 11
16. SUPPLEMENTARY NOTATION			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)  Binocular Style Frame Roadwheel Path Ground Pad	
FIELD	GROUP		
19. ABSTRACT (Continue on reverse if necessary and identify by block number)  The T-156 track being used on the M1 vehicle is made with the roadwheel path rubber and ground pad rubber molded on an integral unit around a binocular style metal insert. The life of this track shoe is severely limited by the rate of wear and chunking to the ground pad side of the track shoe. This contract is an effort to develop modifications to the shoe body and to the ground pad to improve the track life by 20%.  Percent			
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL Dennis Sweers		22b. TELEPHONE (Include Area Code) 313-574-6414	22c. OFFICE SYMBOL DRSTA-RCKT

## PREFACE

The author wishes to acknowledge the help of those people who made this report possible.

**Ed Gow, Chief, Track and Suspension group, TACOM, now retired.**

**Pete Sakalas, Project Engineer, TACOM.**

**Dennis Sweer, Project Engineer, TACOM.**

**George Nichols, Military Coordinator, Standard Products, now retired.**

Accession For	<input checked="" type="checkbox"/>	
NTIS GRA&I	<input checked="" type="checkbox"/>	<input type="checkbox"/>
NTIS TAB	<input type="checkbox"/>	<input type="checkbox"/>
Announced	<input type="checkbox"/>	<input type="checkbox"/>
Classification	<input type="checkbox"/>	
Distribution	<input type="checkbox"/>	
Availability Codes	<input type="checkbox"/>	
Serial and/or	<input type="checkbox"/>	<input type="checkbox"/>
Special	<input type="checkbox"/>	<input type="checkbox"/>



## TABLE OF CONTENTS

Section	Page
1.0. INTRODUCTION .....	6
2.0. OBJECTIVE .....	6
3.0. CONCLUSIONS .....	6
4.0. RECOMMENDATIONS .....	6
5.0. DISCUSSION .....	6
5.1. <u>General</u> .....	6
5.2. <u>Shoes</u> .....	7

## LIST OF ILLUSTRATIONS

Figure	Title	Page
5-1.	Road Wheel Side of Five T-156 Pitches with Removable Pads (XP-1761) .....	8
5-2.	Road Pad Side of Five T-156 Pitches with Removable Pads After 500 Miles .....	9
5-3.	Pad Side of Shoe Showing Pad Metal Breakage Around Bolt Head .....	10

## 1.0. INTRODUCTION

This final technical report, prepared by the Standard Products Company, describes the work done under Contract DAAE07-81-C-4091 to improve the performance of the track used on the M1 Abrams Main Battle Tank. The present track has the ground pad rubber and the roadwheel side rubber bonded to a binocular type metal frame as a single unit. This is probably the lightest construction possible for a track shoe but it does have a short life span due to the wear and chunking on the ground pad side of the shoe. The shoe itself is finished when the ground pad side is worn away regardless of the condition of the rest of the shoe. The present contract presents a 20% increase in track life to be a worthwhile goal.

## 2.0. OBJECTIVE

The intent of this contract is to improve the track life on the M1 vehicle. A 20% increase over present test results is the stated aim. The pad rubber portion of the track shoe as the controlling factor in the life of this track will be the primary subject of redevelopment.

## 3.0. CONCLUSIONS

The pads fabricated under this contract could best be described as makeshift. They were put together from other track parts that happened to be available. Because of this, no long-term testing could be expected. These shoes did however, demonstrate the feasibility of making the track with a removable pad without the use of a heavy steel forging.

## 4.0. RECOMMENDATIONS

There should be additional development of the ideas presented on Standard Products drawings XP-1761 to fit a replaceable pad to the T-156 style track without the use of a heavy forged or cast track shoe. The mounting areas on the track shoe should be made larger to remove the load from directly around the bolt head.

## 5.0. DISCUSSION

### 5.1. General

During the investigative period of this contract, it was decided that altering the rubber shape or material would give only minimal improvement in track life.

The real need is for a pad that can be replaced when it wears out rather than replacing the whole track shoe. Design XP-1761 was developed by Standard Products to make the pad removable without adding any more weight than necessary. To accomplish this, the wheel side rubber was bonded to the original binocular style metal insert.

This rubber was bonded only to the top half of the binocular tubes in the area between the tubes. There was no further steel added to the binocular style insert.

5.1.1. The pad was molded to an 11-gage formed steel plate that wrapped around the lower half of the binocular tubes and formed a deck between the tubes to serve as backing for the wheel path rubber also. (Figures 5-1 through 5-3). Five pitches of this style track were made by using fillers in the T-156 production molds so that only the top or bottom half of a shoe could be molded. A backup metal for the road pad was obtained by altering slightly an existing pad metal for a different track. The pad metal is held in position on the track shoe with two welded projections on one end coupled with a bolt and nut on the other end. The projections are first entered into holes in one end of the shoe. The pad is then rotated down into place with the bolt passing thru a hole in the other end plate. A nut is then used to draw it up tight to the shoe.

## 5.2. Shoes

The five shoes fabricated by Standard Products Company were placed on a vehicle at Chelsea Proving Ground. They were run for approximately 350 miles; they were then sent to Yuma Proving Grounds and run for another 150 miles.

The main problem encountered was a tendency for the pad metal to break at the bolt or for the nut to come loose. Either one of these would allow the pad to be thrown off.

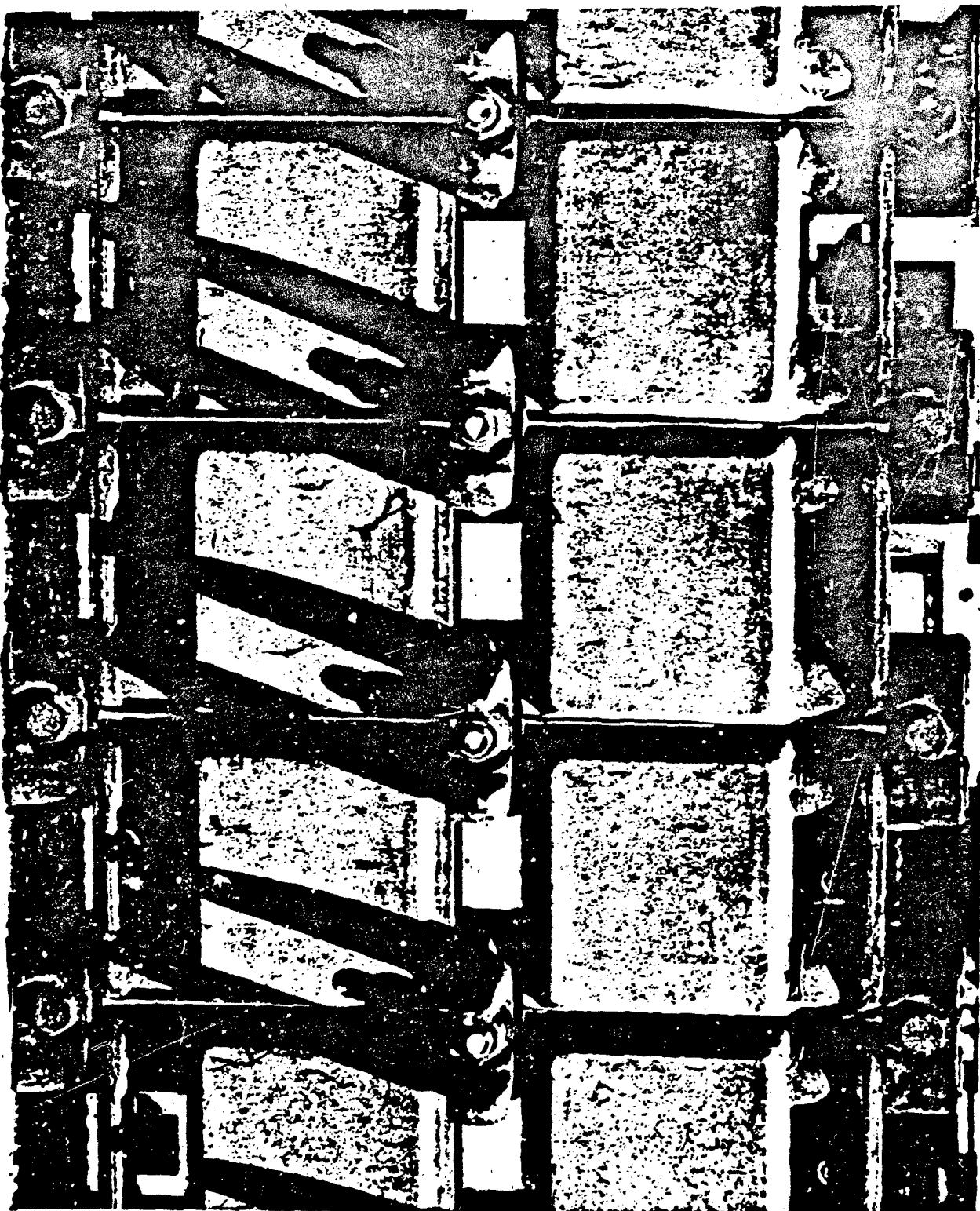


Figure 5-1. Roadwheel side of five T-156 pitches with removable pads. (XP-1761).

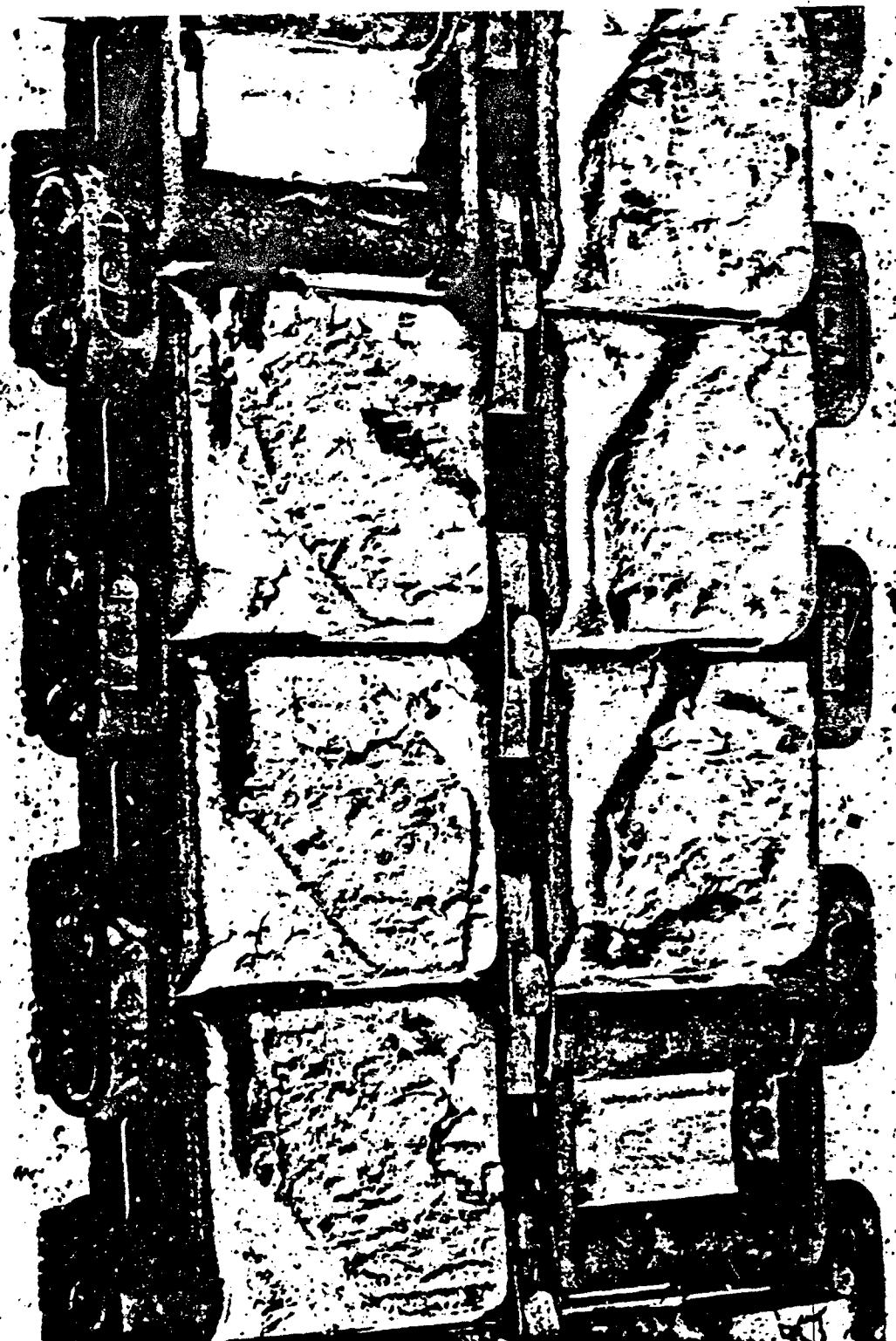


Figure 5-2. Road pad side of five T-156 pitches with removable pads after 500 miles.

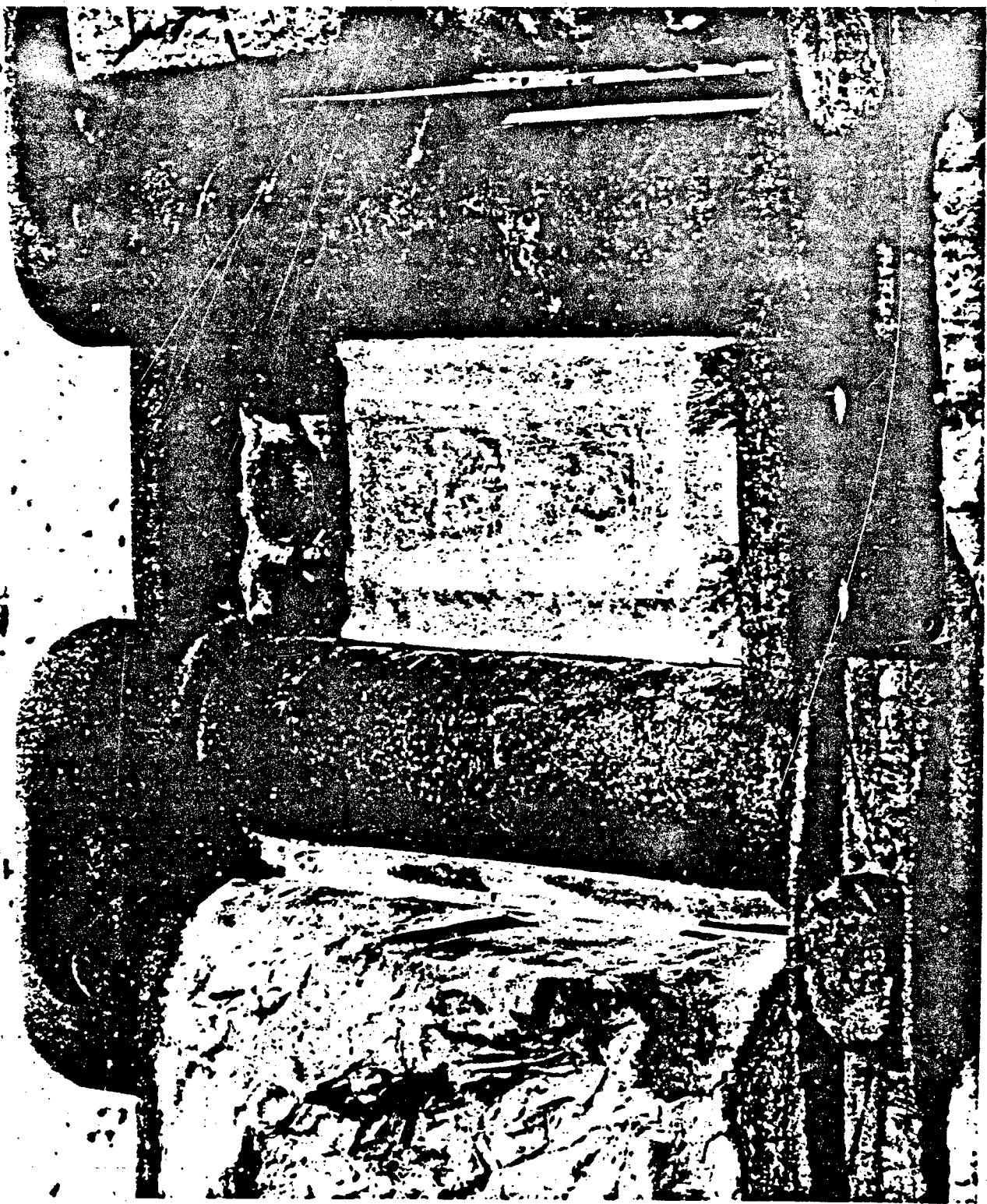


Figure 5-3. Pad side of shoe showing pad metal breakage around bolt head.

DISTRIBUTION LIST

Commander  
U.S. Army TACOM  
Attn: DRSTA-RCKT  
Warren, Michigan 48090

10

Commander  
U.S. Army TACOM  
Attn: DRSTA-IRRR  
Warren, Michigan 48090

1

DCASMA, Cleveland  
Attn: DCRO-GCCW  
A.J. Celebreeze Federal Building  
1240 E. Ninth Street  
Cleveland, Ohio 44199

1

Defense Technical Information Center  
Cameron Station  
Alexandria, Virginia 22314

2